MAKE US YOUR PARTNER!

Seibersdorf Laboratories provide testing services for Total Ionizing Dose (TID), Displacement Damage (DD) and Single Event Effects (SEE). Our team of experts is dedicated to developing both experimental and numerical methods to thoroughly investigate radiation effects on components and systems in various radiation fields.

Our mission is to provide expert radiation hardness assurance services for components and systems, fully compliant with all relevant test standards such as ECSS, ESCC and MIL-STD and accredited to EN ISO/IEC 17025. We serve various sectors including the European (space) industry, nuclear medicine and academic research institutes.

Our vision is to become your primary partner for radiation hardness testing of your systems and components and to support you with advanced numerical investigations tailored to your specific radiation-related challenges.

WHY RADIATION HARDNESS ASSURANCE?

Radiation Hardness Assurance (RHA) is essential due to the susceptibility of electronic components and systems to degradation in electrical performance when exposed to ionizing radiation. As component structures continue to shrink, their susceptibility to radiation increases, underscoring the critical need to ensure uninterrupted functionality. In addition, the increasing relevance of cosmic radiation effects on the Earth's surface emphasizes the need for stringent RHA measures.

These measures play a critical role in ensuring the reliability of equipment used in a variety of industries, including aerospace, nuclear medicine, automotive and various terrestrial applications. To qualify components and systems for use in sensitive environments, they must pass specific test procedures defined by international bodies such as the European Cooperation on Space Standardization (ECSS).

CONTACT

Seibersdorf Labor GmbH
Radiation Hardness Assurance and Space Weather
2444 Seibersdorf, Austria
Tel.: +43 50550-2545 I Fax: +43 50550-2544
www.seibersdorf-laboratories.at

DR. PETER BECK
Head of Radiation Hardness Assurance and Space Weather
peter.beck@seibersdorf-laboratories.at

Studies supported by:

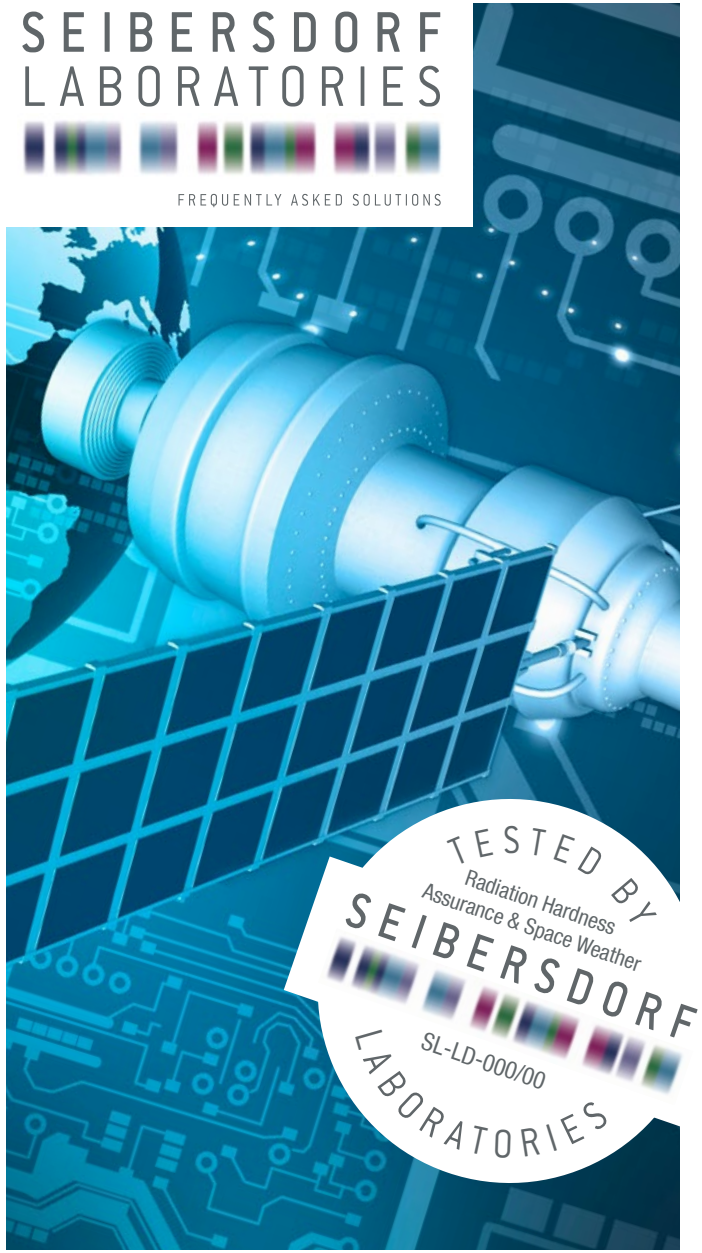
esa

FFG Promoting Innovation

Federal Ministry
Republic of Austria
Climate Action, Environment,
Energy, Mobility,
Innovation and Technology

SEIBERSDORF LABORATORIES

FREQUENTLY ASKED SOLUTIONS

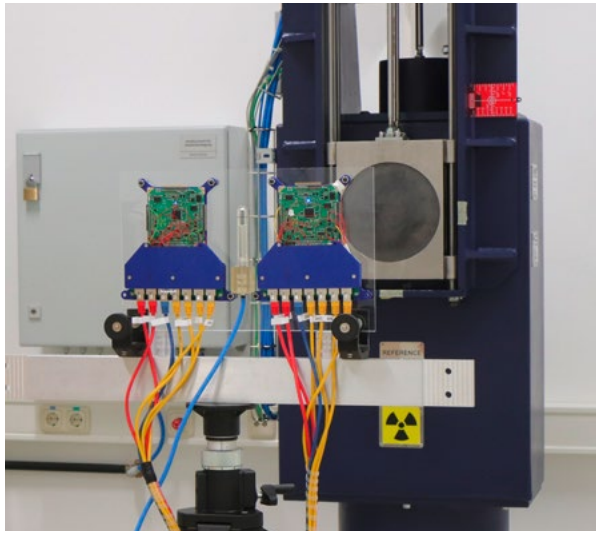


ACCREDITED TESTING LABORATORY

RADIATION HARDNESS ASSURANCE

OUR SERVICES

- Testing Laboratory for TID, DD and SEE radiation testing compliant with ECSS, ESCC and MIL-STD featuring accredited exposure for TID testing and in-house SEE laser testing
- Ensuring the operability of components and systems in typical radiation environments, such as in space, nuclear and accelerators facilities and nuclear medical applications
- Experimental and numerical investigations of all kinds of radiation effects in components and systems
- Consulting users and manufacturers on the use of products in radiation environments
- Manufacturing of irradiation and test boards according to customer specifications
- Participation in the development of test procedures for the European Space Agency ESA
- R&D of radiation sensors such as RADFET, microdosimeter and PIN diodes
- Distribution of SATDOS, an in-house developed dosimeter payload for nanosatellites



TID testing in the TEC-Laboratory Seibersdorf

MODERN EQUIPPED FACILITIES

- Accredited TEC-Laboratory for 24/7 Co-60 gamma exposure at ESA standard and low dose rate radiation 50 Gy/h (5 krad/h) - 0.3 Gy/h (30 rad/h)
- Pulsed Laser Facility for SEE testing and part screening
- Co-60 teletherapy gamma irradiation facility 18 Gy/h (1.8 krad/h) - 0.2 Gy/h (20 rad/h)
- Access to high dose exposure Co-60 gamma ca. 1.5 kGy/h (150 krad/h)
- 320 kV X-ray unit with radiation qualities according ISO and IEC standards, <10 Gy/h (1 krad/h)
- 160 kV X-ray unit as used for diagnostic radiology applications , <10 Gy/h (1 krad/h)
- 60 kV soft X-ray unit, <100 Gy/h (10 krad/h)
- Access to 10MeV electron exposure facility, ca. 10 Gy/s (1 krad/s)
- High Performance Computing cluster customized for Monte Carlo Simulations (FLUKA, Geant4, MCNPX, PHITS)
- Access to proton and neutron test facilities
- Access to heavy ion test facilities
- Multifunctional electronic laboratory with state-of-the-art equipment and industrial parameter analyzers
- Versatile mechanical workshop for 3D printing and for the development and population of irradiation and test boards

QUALITY STANDARDS

- EN ISO/IEC 17025
  Accredited Testing Laboratories No. 312
- EN ISO 9001
  Quality Management Certification
- ISO/IEC 27001
  Information Security Management Certification
- TID, DD and SEE Testing compliant with ESCC-22900, MIL-STD-750, ESCC 25100, ESCC 22500 and ECSS standards
- Accredited Verification Laboratory No. 554
- Accredited Calibration Laboratory No. 612

CONTINUOUS DEVELOPMENT

CORHA – Testing of Commercial Components

Seibersdorf Laboratories coordinated the CORHA project focused on evaluating the radiation hardness of commercial off-the-shelf (COTS) components for space applications. The project involved the comprehensive testing of selected COTS components for total ionizing dose (TID) response and susceptibility to single event effects (SEE). A key aspect of the CORHA study was to formulate an ad-hoc Radiation Hardness Assurance (RHA) approach, aiming to enhance the reliability of COTS technologies in space.

Reference: M. Wind et al., „SEE Testing of COTS Microcontroller and Operational Amplifier in the Framework of the ESA CORHA Study," 2022 22nd European Conference on Radiation and Its Effects on Components and Systems (RADECS), Venice, Italy, 2022.

ELDRS – An Experimental Survey

ELDRS (enhanced low dose rate sensitivity) of electronic components is important for component operation in a low dose rate radiation field, e.g. for satellites. Low dose rates and high total dose levels need long test duration and create high testing costs. An accelerated testing method using switching of high and low dose rates has been investigated. Statistical analysis has been performed to decrease test sample size.

Reference: Wind, M., Beck, P.; Boch, J.; Dusseau, L.; Latocha, M.; Poizat, M.; Zadeh, A., Applicability of the Accelerated Switching Test Method - A Comprehensive Survey, Radiation Effects Data Workshop (REDW), 2011.

e^2RAD – Shielding of Energetic Electrons

The performance of graded shielding of aluminium, lead and tantalum in energetic electron fields is investigated. Monte Carlo codes simulations using FLUKA and GEANT4 are compared with experimental measurements (5 MeV - 50 MeV). The results will be used for ESA's Jupiter Icy Moons Explorer (JUICE) mission.

Reference: Wind M., Bagalkote J., Beck P., Latocha M., Georg D., Stock M., Nieminen P., Truscott P.; e2-RAD: Results of the ESA Energetic Electrons Radiation Assessment Study, NSREC Contribution at the IEEE Nuclear and Space Radiation Effects Conference, Paris, 2014.